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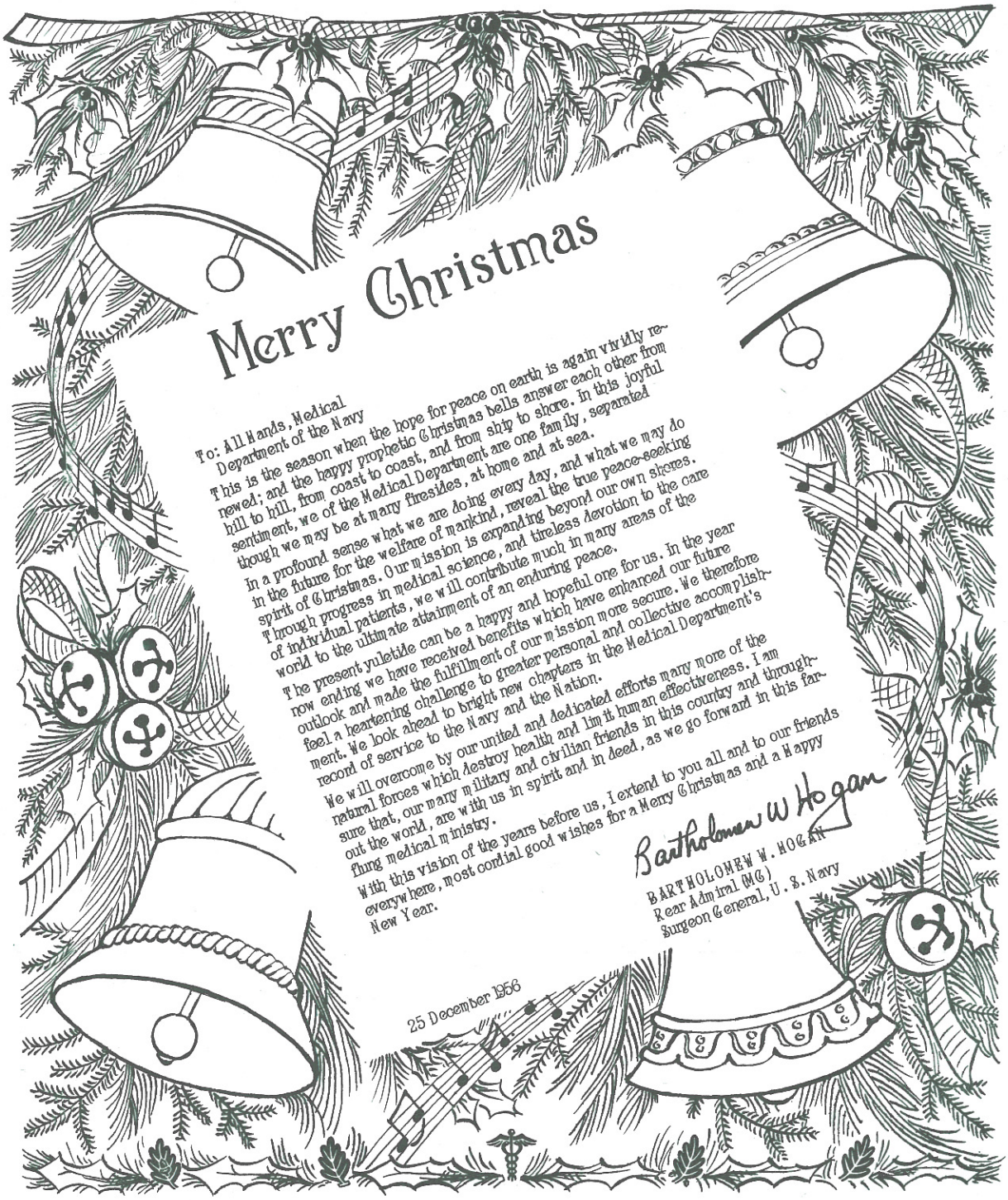

Merry Christmas

To: All Hands, Medical
Department of the Navy

This is the season when the hope for peace on earth is again vividly renewed; and the happy prophetic Christmas bells answer each other from hill to hill, from coast to coast, and from ship to shore. In this joyful sentiment, we of the Medical Department are one family, separated though we may be at many firesides, at home and at sea.

In a profound sense what we are doing every day, and what we may do in the future for the welfare of mankind, reveal the true peace-seeking spirit of Christmas. Our mission is expanding beyond our own shores. Through progress in medical science, and tireless devotion to the care of individual patients, we will contribute much in many areas of the world to the ultimate attainment of an enduring peace.

The present yuletide can be a happy and hopeful one for us. In the year now ending we have received benefits which have enhanced our future outlook and made the fulfillment of our mission more secure. We therefore feel a heartening challenge to greater personal and collective accomplishment. We look ahead to bright new chapters in the Medical Department's record of service to the Navy and the Nation.

We will overcome by our united and dedicated efforts many more of the natural forces which destroy health and limit human effectiveness. I am sure that, our many military and civilian friends in this country and throughout the world, are with us in spirit and in deed, as we go forward in this far-flung medical ministry.

With this vision of the years before us, I extend to you all and to our friends everywhere, most cordial good wishes for a Merry Christmas and a Happy New Year.

Bartholomew W Hogan

BARTHOLOMEW W. HOGAN
Rear Admiral (MC)
Surgeon General, U. S. Navy

25 December 1956

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor are they susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Obesity and the Reduction Diet

The cause of obesity under all circumstances is excessive caloric intake. This may occur because of lack of knowledge of food values or the dangers of obesity, as a result of lack of will power, or because of psychic needs for food by the individual concerned. Many people have an erroneous conception of obesity as a sign of health and an erroneous idea that it is normal for people to become fat as they grow older. Newburgh and Johnston list reasons for overeating as (1) habit inculcated by an overzealous mother, (2) gratification from flavor of foods, (3) feeling of repose and comfort produced by a full stomach, (4) temporary respite from difficulties not mastered, (5) no diminution in appetite with diminished need for food, and (6) greater requirement for food in youth than in later years, but food habits of early years hold sway. Within recent years, many articles have stressed the emotional and psychiatric aspects of obesity and have shown that, in many instances, obesity is not a disease per se, but a symptom of a more underlying psychiatric abnormality.

That obesity is not caused by an economy of food or by increased absorption of food from the gastrointestinal tract has been well proved. Many investigators have not been able to demonstrate any significant differences in the body mechanism of obese and slender people as regards digestion, absorption, assimilation, metabolism, or specific dynamic action of foods ingested.

As for the role of heredity in obesity, it is generally agreed that body build is inherited, but that obesity is not, except for a tendency to a greater appetite and less physical activity. Obesity in a family is a product of the environment and development of similar eating habits in members of the family. A long established habit of eating certain quantities of food has a profound influence on the appetite.

Some individuals who are obese and claim not to eat much, nevertheless, use the very high caloric foods, fats, alcohol, and high carbohydrate foods, including many soft drinks. Because some foods are 100 times as fattening as others weight for weight, the quality of food consumed is sometimes more important than the quantity.

As for the objections to obesity, statistics well show that this condition shortens life expectancy and makes people less comfortable. The incidence of varicose veins, symptoms referable to the joints of the lower extremities, backache, hernia, and toxemia of pregnancy is high among obese people. The operative risk is much greater among obese patients than it is among slender patients. There is experimental and clinical evidence that the incidence of arteriosclerosis is increased among persons who consume diets which lead to obesity. A definite correlation exists between arteriosclerosis and the fat content of the blood and body. Slender people have fewer complications of atherosclerosis. It is well known that the incidence of gallstones and fatty liver is increased among obese persons. Although the causes of hypertension remain debatable or unknown, there is an increased incidence of hypertension among obese persons and in an appreciable number of cases the blood pressure decreases as the body weight is reduced. Weight reduction is certainly one of the best forms of therapy for obese patients who have hypertension.

If added weight is sufficient, it may inhibit expansion of the chest and movement of the diaphragm which may result in dyspnea on effort. This is not necessarily an indication of heart disease. Obesity, however, is one of the most frequent avoidable causes of heart failure in patients with organic heart disease. A person who is overweight must consume a greater amount of oxygen for a given amount of work and the demand on the heart consequently is increased. Overweight patients with angina pectoris usually obtain definite benefit from dietary restriction. The tolerance for exercise is increased and the frequency and intensity of the pain are diminished. In some cases of congestive heart failure in which the patients are obese, all evidence of heart failure disappears after the weight has been reduced. In cases of myocardial infarction in which the patients are slender, the probability of survival is definitely greater than it is in cases in which the patients are obese.

The incidence of diabetes is extremely high among fat people. Most people are unaware of the threat to life that obesity entails and they can scarcely be expected to take such a condition seriously until they acquire this information. All obese patients are not psychiatric problems. In some cases, simple psychotherapy, reassurance, and encouragement at checkup office calls suffice. Other patients, it is true, seem to have a compulsion to eat which makes simple low caloric diet instructions inadequate. Certainly it is true that some obese patients require more intensive psychotherapy.

Ideally, weight reduction should be supervised by a physician who can make an examination to rule out any complications, give instructions in a well balanced low caloric diet, and follow the patient at frequent enough intervals to lend encouragement, reassurance and guidance. An average obese

patient will lose 8 to 12 pounds per month and do himself no physical harm by remaining on a well balanced 1200 calorie diet. The older the patient and the more sedentary his existence, the less rapidly will he lose weight; the younger and more physically active the patient, the more rapidly will he achieve the desired results. Elderly patients must, occasionally, be placed on a still lower caloric diet to lose excess pounds.

The patient must be taught relative food values and be taught to refrain from using fats, sweets, nuts, tidbits, between-meal snacks, alcohol, soft drinks, fried foods, gravies, et cetera. The well balanced 1200 calorie diet must contain an adequate amount of protein, including at least a fair sized portion of lean meat, two eggs, their meat equivalent, or cottage cheese, and preferably a pint of milk a day. Adequate bulk can be supplied by large-sized portions of the very low carbohydrate leafy vegetables. It has been pointed out that liberal portions of low carbohydrate vegetables are better than appetite-destroying drugs. Ten percent fruits and vegetables in portions available for the diet (as listed in tables) help to balance the diet which will also allow one slice of bread and one level teaspoon of butter each meal. Avoidance of the higher carbohydrate 15% and 20% vegetables and fruits is stressed.

Success or failure in reducing depends, among other factors, on the meaning of weight reduction for the patient. To an adequately adjusted overweight person, it is a rational task with the main goal of losing weight. Even then it is not easy and simple and many patients need support and supervision.

Prevention of obesity and retention of normal weight are matters of importance in the field of preventive medicine. Loss of weight by the obese is essential for the greatest life expectancy and well-being. This can be attained by low caloric intake. (Jones, G.M., Obesity and the Reduction Diet: Postgrad. Med., 20: 451-456, November 1956)

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Hemorrhagic Herpetic Encephalitis

The etiology of encephalitis is not determined for most of the patients who are observed by physicians. Clinical impressions may be misleading, and postmortem examination often serves only to establish a pattern of pathologic changes that may permit classification of the disease into one of several general types. Whenever it is possible, attempts should be made to isolate the viral agents from the spinal fluids during life, or from the brains of patients who die from this disease. During recent years, herpes simplex virus has been associated with sporadic cases of meningitis and encephalitis that were observed in various parts of the world. On the basis of the development of antibodies, presumptive diagnoses were made in eleven nonfatal cases in Sweden. In the same study of a series of 37 patients, the findings suggested that as many as 21% of all of the sporadic

cases of acute encephalomeningitis (occurring chiefly in adults who did not have herpes antibodies at the beginning of the disease) may be caused by herpes virus.

It is well established that herpes simplex virus may cause disease in the central nervous system varying from a slight meningitis to extensive fatal encephalitis. The development of antibodies in persons who survive such infections suggests that these conditions may be acute primary infections and the antibodies reflect a reaction to the first exposure to the virus. Herpes simplex virus is sometimes recovered from the central nervous systems of patients with herpetic lesions in the skin and such persons may have asymptomatic meningitis as indicated by pleocytosis of the cerebrospinal fluid. Experience has not shown to what extent the herpes simplex virus may be an invader by chance in those instances where it is found in the central nervous system in association with various diseases. It may well be the cause of a superimposed infection. The exact relationship might be difficult, or even impossible, to prove in instances of postinfectious encephalitis or chronic encephalitis of the lethargic type.

A variety of physical and chemical agents are known to be factors in the precipitation of attacks of dermal herpes and it is usually assumed that the virus pre-exists in the affected person and that it is activated by some physiologic stimulus. Meningoencephalitis may be a feature in such disease that is activated by artificially induced fever. When encephalitis occurs in a person who has herpes simplex virus in the central nervous system and herpes immune antibodies, the disease may be the result of a similar activation.

The pathologic changes observed in herpetic encephalitis include nonspecific general findings such as, inflammation, hyperemia, edema, and perivascular exudate, as well as alterations that seem to be characteristic of the disease. The latter include hemorrhages, focal necroses (sometimes with grossly detectable softening) and acidophilic intranuclear inclusion bodies, occurring particularly in glial cells. Much has been written in regard to hemorrhagic encephalitis as a nosologic entity. The principal feature of these cases is hemorrhage, but demyelination is sometimes prominent. There are probably several agents that may cause this condition and the viruses presumably isolated from the patients were not identified with certainty. In addition to herpetic encephalitis, hemorrhage may be a prominent feature of other encephalitides, such as poliomyelitis and postpertussis encephalitis. Furthermore, petechiae, or even large hemorrhages, are commonly observed in other conditions, namely anoxia, poisoning with carbon monoxide, intoxications by heavy metals and alkaloids, bacterial infections, deficiencies of vitamins, and blood dyscrasias. Rather than think of hemorrhage as a special morphologic entity, it seems preferable to regard it as one component of various diseases. Thus, it also seems preferable to abandon the term hemorrhagic encephalitis unless it is qualified in regard to etiology.

Two principal findings attend the finding of intranuclear inclusion bodies in the brain: (1) Do they occur invariably as a feature of herpetic infection? (2) If not herpetic, what is their origin? At the present time, a definite answer to either question is not known.

A presumptive diagnosis of herpetic encephalitis can be made with reasonable certainty only if the virus is isolated from the central nervous system and an increase in the titer of herpetic antibodies is observed. The latter type of evidence may not be obtained in all instances inasmuch as herpetic encephalitis may be rapidly fatal. Regardless of the serologic findings, isolation of the virus from the central nervous system and the presence of acidophilic intranuclear inclusion bodies are strong evidence of herpetic infection. A rise in the titer of herpes antibodies (with or without additional findings) suggests a recent infection with the herpes simplex virus. The finding of inclusion bodies, without proper support from other evidence, should not be regarded as diagnostic of herpetic infection. (Pearson, H. E., Butt, E. M., Hemorrhagic Herpetic Encephalitis: Am. J. Clin. Path., 26: 1174-1178, October 1956)

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Tissue Changes During Aging

The ever increasing life span and age of the population in the United States have focused attention more critically upon the problems and the needs of the aging person. Disease patterns in the aged differ from those in children or in young adults and need to be treated differently because each age period brings with it marked changes in metabolic processes, vitality of cells, endocrine balance, dietary patterns, and mental processes.

The dentist (generally the prosthodontist) dealing with the aged person must understand the fundamental physical, mental, and metabolic changes that occur during aging in order to render a more complete and intelligent dental service to his patient.

The geriatric patient presents many oral complaints peculiar to, and characteristic of, aging tissues. Sometimes it is difficult to decide whether these complaints are the result of normal tissue changes, endocrine, or nutritional deficiencies, or whether they are psychic in origin.

Prosthetic failures still occur in the geriatric patient in spite of remarkable advances in the technical aspects of prosthodontics. There is good evidence to suggest that, in this group, prosthetic failures are more often the result of tissue deficiencies than technical deficiencies. It is axiomatic that the best denture is no better than the tissues which bear it.

This article presents briefly the clinical characteristics of aging and the deficiency states most often seen in the geriatric patient and correlates these changes with some of the dental problems that the prosthodontist and general practitioner encounter in these patients.

The most common oral complaints result from the fact that the aged mucosa is friable and easily injured. Traumatic ulcers under new or even old dentures are a constant concern to the patient and the dentist. This is probably the most frequent direct cause of the patient's inability to tolerate the prosthesis.

Tissue friability arises from three distinct sources. The shift in water balance from the intracellular to the extracellular compartment, plus diminished kidney function results in a progressive dehydration of the oral mucosa. This is aggravated by a progressive thinning of the epithelial layer as age advances. Finally, the cells are nutritionally deficient. Even under the best circumstances, in the aged these cells do not enjoy the optimal nourishment and the vitality of youthful cells. Because deficiencies in the nutrition of the cells are the rule rather than the exception, the following conditions result: reduced metabolism of these cells due to vitamin B deficiency, reduced cohesiveness and integrity of the epithelial layer due to vitamin A deficiency, and poorly differentiated connective tissue cells and fibers due to vitamin C deficiency. The clinical result is that the epithelium tears easily and the connective tissue heals slowly. Canker sores, traumatic ulcers, and angular cheilosis are frequently found under mild stress or even when stress is not apparent.

Abnormal taste and burning sensations in the mouth are another frequent complaint. Eighty percent of postmenopausal women complain of these symptoms at one time or another. These symptoms may be related to low estrogenic levels and vitamin B complex deficiencies.

Calcium deficiencies and even negative calcium balance are common in elderly persons. Such a patient cannot be expected to maintain normal bone metabolism and structure with the result that osteoporosis occurs in stress-bearing areas such as the vertebrae. Osteoporosis also occurs in the mandible and maxillae. However, further study is necessary to determine whether this is related to negative calcium balance, lack of function, or both.

Delayed healing of extraction wounds with excessive and painful postoperative swelling may be related to the relative or absolute vitamin C deficiency so often found in the aged. A number of reports indicate that high doses of ascorbic acid (150 to 200 mg. per day) before and after surgical procedures promotes healing and seems to reduce the incidence of postoperative swelling, pain, and infection. In recent reports, additions of amino acids have been stressed.

Overgrowth of Candida albicans (thrush) is relatively common in the aged, especially under full dentures and in those patients with clinical signs of vitamin B deficiencies.

Causalgia, pain in an edentulous area from which a painful tooth was extracted some years before is not uncommon in the aged. Many flap operations and bone scrapings have been done to alleviate these characteristic pains (which become intensified with time), especially when these interfere

with the wearing of dentures. Causalgias may be referred to facial areas and diagnosed as atypical facial neuralgias. Characteristically, causalgias are often related to emotional disturbances and, for this reason, treatment is often difficult.

Finally, one is confronted with the vague pains and fears characteristic of the insecure at any age level. These require patience and understanding. These persons can be helped considerably by those who understand the problems of aging and are willing to grapple with them.

Dental care for the aging patient presents a number of problems not encountered in younger groups. Most of these result from tissue changes that occur during aging. The gerodontist, especially the prosthodontist, is in a strategic position to evaluate and correct many of the dietary and nutritional deficiencies that promote premature aging of tissues. In particular, the gerodontist is in a position to reduce the number of prosthetic failures in the aging patient by a thorough understanding of the various physical, metabolic, and endocrine changes that occur during this period, as well as the dietary and nutritional deficiencies and the emotional disturbances that characterize the aged. Geriatric patients can be helped toward optimal health and happiness by those who are willing to study their problems. (Massler, M., Tissue Changes During Aging: Oral Surg. O M & O P, 9: 1185-1196, November 1956)

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Rehabilitation of the Hard of Hearing

The person who is hard of hearing often has problems that reach far beyond himself and his own difficulties. His hearing defect affects those around him; it affects his family and his associates. Frequently, his ability to hold a position is entirely dependent upon his ability to hear. Not only holding a position, but advancing oneself, often depends on adequate hearing. Unfortunately, a person who is hard of hearing has a tendency to undergo definite personality changes; otologists try to prevent this at all costs because such changes, once they have occurred, are often irreversible. Too often one sees persons who have become introverted as they lost their hearing. They do not mingle with others; they stay by themselves. Their social activities are cut to a minimum. There is a definite loss of self-confidence. Once a human being becomes withdrawn and introverted, a serious problem is present involving the personality as well as the hearing.

Often those who are hard of hearing will show a loss of facial expression. There are also changes in the voice depending on the type of hearing loss. A person with nerve deafness will speak very loudly because he does not hear his own voice. A person with a conductive loss speaks very softly and sometimes can hardly be heard.

Understanding the basic physiologic nature of hearing, one realizes that two types of hearing loss can occur. The first is the type in which the end organ of hearing (the cochlea) is disturbed. This is called the "perceptive type" or a "nerve type" of deafness; the cochlea itself is not able to receive the sound that comes to it. A rather large number of patients have hearing losses of this kind as a result of degenerative processes, viral and bacterial infections, toxic disturbances, et cetera. Unfortunately, in the presence of nerve deafness, the degenerative process is irreversible.

On the other hand, a large proportion of the hard of hearing have a conductive type of hearing loss. With this type, the sound is impeded at some point along the ossicular chain before it reaches the cochlea. For the patients in this group, the otologist can do a great deal—much more than for those with nerve deafness.

Patients with degenerative intracochlear changes can be helped in some instances only by a hearing aid; there are certain cases in which even a hearing aid cannot help. This is because a hearing aid is nothing more than an amplifier and there must be some degree of residual sound left that can be amplified within the cochlea. If little or none exists, poor results will be obtained through the use of an instrument. A hearing aid can also be used by a patient with conductive hearing loss and is more effective than when used with the "nerve type" loss.

If one has the opportunity to restore hearing, however, either through the use of a hearing aid or by a specialized surgical procedure, it is usually more desirable to use the surgical approach because a more natural type of hearing can be obtained.

This article is limited to the rehabilitation of patients with conductive hearing loss, namely, the type due to otosclerosis. The hearing loss caused by otosclerosis, if left to run its course, is progressive and irreversible. It is an extremely complex process, going through several pathologic stages.

The fenestration operation, in which a new window is created in the horizontal semicircular canal, is now familiar to all. With this procedure, the surgeon reroutes the sound so that the middle ear and the oval window are bypassed; instead, the sound waves enter the fenestra in the horizontal semicircular canal and are absorbed into the perilymphatic fluid.

The author discusses a new technique for the rehabilitation of patients with this same otosclerotic deafness—a procedure called mobilization of the stapes. An attempt is made to mobilize the fixed stapes by approaching it directly through the middle ear. The whole basis of this procedure is utilization of the ossicular chain to transfer sound to the cochlea in the normal manner. This idea is not a new one, having occurred to various men in the 1880's and 1890's. It was never really a practical procedure in those days, however, and eventually all efforts to loosen the stapes were abandoned. It was not until 1953 that Dr. Samuel Rosen deliberately worked out a technique by which, under direct visualization, good lighting, and high magnification,

he was able to accomplish mobilization of a fixed stapes, using the same technique, but with certain modifications.

What are the hearing results? This is the most important point. The author has observed that approximately 36% of good results can be obtained with these patients. In other words, approximately one out of three patients accepted for operation will have his hearing restored or will be rehabilitated to a point at which his hearing will help him socially and economically.

What happens to this new hearing? Does it hold up? So far, observations of the postoperative results extend over 2 and 1/2 years. One out of every five patients who obtained good results has shown a tendency to lose the initial improvement. This usually occurs within the first month, or it may appear gradually over approximately 6 months. On revision of these cases, it was observed that there was a refixation of the stapes either equal to that observed at the first operation or greater. In such cases, it becomes necessary to do a revision. Revision is a simple procedure because, if it is necessary to remove any bony annular rim, this has already been done at the first operation. In this series—interestingly enough—the hearing level in the majority of cases in which revision was done showed no tendency to slip a second time.

If the first mobilization of the stapes of one ear has failed to produce results, the course in rehabilitation should not be abandoned. It is generally advisable to attempt mobilization of the stapes of the other ear at a later date, because the hearing loss associated with otosclerosis is usually bilateral. The fact that one mobilization has failed does not mean that the other will respond in the same way because, as is well known, the actual degree of fixation of the stapes is often not related to the degree of the hearing loss. For instance, in a single patient with a severe hearing loss the stapes in one ear may be fixed to such an extent that it feels like a stone, whereas, in the other ear it can be readily mobilized. Knowing this, the author advises his patients to have the other ear operated upon should the first procedure fail.

As can be imagined, however, there are cases in which the desired result is not obtained after either mobilization. One must prepare the patient for this possibility and try to make him understand that what he is actually going through is a course of rehabilitation, and that anything worthwhile in this world—particularly hearing—does not come easily. The majority of patients will go along with this advice knowing that the otologist has their interests at heart.

What is the next step if surgical mobilization has not been successful? Fortunately, it is still possible to do a fenestration operation with the same possibility of obtaining a good result as if no previous operation had been done on the ear. Excellent results have been obtained with this technique.

The full course of surgical rehabilitation for an otosclerotic patient consists first of mobilization of the stapes in one ear and possibly in the

other; then, if necessary, fenestration. At present, fenestration is considered more in the light of a major operation than is mobilization of the stapes; also, it is more confining for a patient and poses certain postoperative problems. The author prefers to try the simpler of the two procedures first, even though a higher percentage of good results may be obtained by fenestration.

The author emphasizes the difficulties, personal, social, and vocational of the unrehabilitated person with a defect of hearing. One of the chief dangers is change in personality. The chief emphasis of this article is placed on rehabilitation of patients with a conductive type of hearing loss, i.e., otosclerosis. Fenestration and its benefits are mentioned and a procedure more recently devised—mobilization of the stapes—is described with details of the technique. Local anesthesia is used; the patient is hospitalized for one night only and is usually able to return to work within a day or two after the operation.

In the author's experience with more than 500 cases, complications have been minimal (one case of parotitis after injection of the local anesthetic, one case of facial paresis which was resolved within a few days, and one case of labyrinthitis following operative work at and around the foot plate of the stapes). Perforation of the tympanic membrane may occur, but can not be considered a complication because it generally heals within a few days. Infection, should it occur, can be readily controlled with antibiotics and local treatment. In approximately one out of three patients the results with regard to hearing are excellent. As to the duration of the improvement, only one out of five shows a tendency toward recurrent deafness.

The author points out the great importance of treating the hard-of-hearing patient as a whole because his rehabilitation depends not only upon the improvement of his hearing, but on the restoration of his self-confidence and social ease. (Scheer, A. A., Rehabilitation of the Hard of Hearing: J. Internat. Coll. Surgeons, XXVI: 605-612, November 1956)

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Corticosteroids in Severe Peritonitis

The patient with an adrenocortical insufficiency is generally recognized as having a poor tolerance to infection, even of a minor nature. It is also recognized that an overwhelming sepsis may produce a relative adrenal insufficiency. With the isolation and development of the adrenocorticotropic hormone of the pituitary and the various steroids of the adrenal cortex, an impetus was given to the study of the effects of these hormones on patients with severely toxic states.

The basic principle behind the therapy of an acute overwhelming infection with adrenocorticotropic hormone and the adrenocortical steroid

hormones is based on the hypothesis that these hormones block the toxic effect on the body cells, while the antibiotics and chemotherapeutic agents produce their growth-inhibiting effect directly upon the multiplying organisms. The exact mechanism for this toxin blocking effect is not known.

The adrenocorticotropic and adrenocorticosteroid hormones are known to exert a marked anti-inflammatory effect. This effect is well documented. In addition to the anti-inflammatory effect, these hormones also seem to exert a toxin blocking effect. The mechanism for this effect is not well understood. However, on the basis of the experience of others in the treatment of extremely toxic persons with severe medical diseases, it was believed that this same effect might be produced in persons with severe fulminating peritonitis. This is the group in which, in the past 5 years, hormones have been used in conjunction with chemotherapeutic and antibiotic treatment, plus other supportive measures. In the reported series, only 50 patients were so severely ill that they were considered candidates for this therapy. Of these, 19 did not receive the supplemental corticoid therapy for one or more reasons. Only 3 survived in contrast to 12 who survived of 31 patients on the corticoid therapy. In each group there were patients who were so severely ill that no form of therapy would have been of benefit. These were not excluded from this study. Unfortunately, in a hospital dealing with indigents, the length of hospital stay cannot be used as a criterion for morbidity because the length of hospital stay is determined by whether the patient has a home in which to convalesce rather than by the state of his health. From the cases studied, the authors believe that, where properly used, the corticoids have permitted definitive surgery in patients who might otherwise not have been operated on. It must be emphasized, however, that the adrenocorticotropin and adrenocorticosteroid hormones may mask the cause of the infectious process by reducing the toxicity and, therefore, the clinical appearance of the patient cannot be used as a measure of his true state.

The authors, therefore, rigidly adhere to the rule that all patients who are treated with corticoids, plus other measures for severe peritonitis, must be treated surgically as soon as their clinical condition permits. The authors found also, through bitter experience, that the antibiotics must be continued for 5 to 7 days following the conclusion of the corticoid therapy.

When properly used, therapy with the adrenocorticotropic and adrenocorticosteroid hormones in combination with antibiotics, plus fluid and electrolyte replacement, may lead to a better survival rate in patients who are seriously ill with peritonitis. These hormones permit one to carry out indicated surgical procedures in patients who would otherwise be too toxic to withstand the procedure. (Henegar, G. C., Hunnicutt, A. J., Kinsell, L. W., Experience with Corticotropin and Corticosteroids in Severe Peritonitis: Arch. Surg., 73: 804-810, November 1956)

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The Rodent Ulcer

The term "rodent ulcer" is an old one derived from the locally invasive nature of the tumor. It describes a generally recognized clinical entity and is perhaps best retained because of the confused histologic picture which conforms so poorly to the more scientific synonym, basal-cell carcinoma. The tumor usually grows in skin which shows atrophy and keratosis in the epidermis and chronic inflammatory change in the corium. It most commonly arises from the basal cells of the skin and pilosebaceous follicles. Characteristically, the tumor appears as a conglomerate of ovoid cells showing numerous mitotic figures and surrounded by a layer of palisaded cells, but all variations of differentiation to glandular structure are seen between this type and the adnexal adenomas, so that one may find no mitotic figures, no palisading, and a very glandular pattern. Some tumors show areas of squamous differentiation. Occasional examples are pigmented. Recurrent tumors, frankly basal-cell in their original state, sometimes show change to epidermoid form.

Etiologically, the rodent ulcer makes a fascinating study. Modifying the basic unknown cause common to all malignancies are secondary factors almost as obscure. Common points of origin of the tumor are at the junction of nose and cheek and the outer corner of the eye. This is in keeping with other forms of epithelial malignancy which show a predilection for areas of embryologic transition.

The disease almost always occurs on the exposed parts of the body, that is, on the hands and face. This is accepted as strong evidence that the sun's rays and wind and weather act as chronic irritants and hence as carcinogenic factors. This is probably correct, but two observations indicate that they may not be as important causative agents as most believe: (1) the relative rarity of lesions on the hands as compared with the face, with the exposure of hands to the elements being not grossly less than that of the face, and (2) the common occurrence of intraoral degenerative lesions, particularly leukoplakia in cases of rodent ulcer and its precursor, hyperkeratosis.

The higher incidence of rodent ulcer among men is commonly attributed to their greater exposure to the chronic irritation of weather. This may be a reason, but there are others which the author believes to be as important. The average woman is likely to maintain more pride of appearance in her later years than is her consort, hence she is rarely without teeth of some sort, and, thus, has a better diet. Society deals more kindly with her in her late years than it does with her husband. She is not subjected to that crushing psychologic indignity of retirement. Her life's labors become modified rather than changed. If she is dependent on someone else for her existence, it is probably no more than she has been throughout her life. She does not sit in a chimney corner, inactive, reminiscent, and waiting. If the

psychogenic may not be accepted as a factor in cancer production, at least it has to do indirectly with inadequate exercise and nutrition.

Finally, and perhaps most important, is the essential difference between the skin of man and woman. It is not necessary to do complex and often unreliable biological assays to know that the softer more elastic skin of the female is a concomitant of her endocrine balance and that even the menopause with its reduction of ovarian secretion brings little change in this attribute. In converse, the thicker, hornier epidermis and the coarser skin texture of the male, which is characteristic of his virility, is also the precursor of the degenerative changes which lead to malignant breakdown of the skin.

No aspect of treatment of the rodent ulcer is more important than destruction of the hyperkeratotic premalignant areas of the skin by electrodesiccation or excision. When lesions over the face, ears, and neck are numerous, either method may be too formidable an undertaking. Consideration must also be given to the fact that scalpel and high-frequency current are both irritants in themselves and, thus, to slight degree, carcinogenic. The patient with many lesions is best treated by observation over the years, coupled with advice on the care of the skin. More advanced areas of hyperkeratosis may be excised or destroyed. In doubtful cases, excision and histologic study are necessary and, if malignant degeneration is already present, more adequate treatment should be given. (Murphy, A. L., The Rodent Ulcer: Geriatrics, 11: 503-507, November 1956)

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Hormone Therapy in Prostatic Cancer

The relatively common occurrence of prostatic cancer, the frequency with which it is inoperable, and the simplicity and success of palliative endocrine treatment combine to make the hormonal control of prostatic cancer a common and an important therapeutic experience. In order to indicate the place and justify the use of endocrine therapy in the management of the patient with prostatic cancer, consideration must be given to other aspects of the problem. Accordingly, in this article, some space is devoted to the pathology, clinical classification, incidence, natural history, and diagnosis of prostatic neoplasms before discussion of therapy is attempted.

The vast majority of prostatic cancers are carcinomas and most are adenocarcinomas. Although the common site of origin of prostatic cancers is in the peripheral portion of the gland, a few neoplasms appear to originate within the adenomatous enlargements responsible for benign prostatic obstruction.

For the purposes of this discussion, it is convenient to divide prostatic cancers into four clinical stages.

Stage I - Clinically latent prostatic cancer. This is a stage of the disease in which neither symptoms, signs, nor laboratory studies short of actual pathologic examination, lead to suspicion of the presence of cancer, but microscopic study of tissue from the prostate reveals the presence of previously unsuspected cancer.

State II - Clinically manifest early prostatic cancer. This is a stage of the disease in which symptoms are absent, but a suspicion of carcinoma is aroused by the presence on digital rectal examination of a more or less circumscribed area of induration apparently confined within the limits of the prostatic capsule and no evidence of metastasis can be found.

State III - Clinically manifest locally advanced prostatic cancer without evidence of distant metastases. This is a stage of the disease in which rectal examination discloses a variable degree of induration of the prostate, seminal vesicles, and bladder base, but evidence of metastases cannot be demonstrated.

Stage IV.- Clinically manifest advanced prostatic cancer with evidence of distant metastases. This is a stage of the disease in which the manifestations of the cancer in the prostatic area vary in respect to symptoms and digital rectal findings, but conclusive evidence of metastases is demonstrated.

Despite obvious limitations of this arbitrary clinical classification, it is on the basis of available clinical information that therapeutic plans for the patient ordinarily are proposed; therefore, use of this method of classification into stages can be defended, if not endorsed.

The diagnosis of prostatic cancer is dependent upon pathologic examination of prostatic tissue. However, in clinical experience, symptomatic and physical manifestations, laboratory techniques, and pathologic studies may be helpful in detection of such neoplasms.

The general aim of treatment is to prolong life with comfort when possible, and at the least, to provide comfort if life cannot be prolonged, Because all forms of therapy carry some risk to life, to comfort, or commonly to both, the risk of the therapy proposed in any particular situation should be less than the risk of the cancer in that particular situation. The clinical judgment involved in making a therapeutic decision obviously demands consideration not only of the natural history of the tumor, but also the "natural history" of the host.

The major therapeutic choices in the patient with a prostatic cancer are three: (1) no treatment, (2) surgical excision, and (3) endocrine therapy. Of these major therapeutic alternatives, only surgical excision is potentially curative, the programs of nontreatment and of endocrine therapy being palliative only. Accordingly, the initial decision must generally determine whether therapy is to be aimed at cure or at palliation. Methods of therapy

for prostatic cancer, other than the three major alternatives mentioned, are considered in discussing the specific therapy of each of the four clinical stages of the disease.

The applications of endocrine therapy in prostatic cancer are logically dependent, first upon knowledge of the endocrine factors concerned in normal prostatic growth and/or function, and second, upon evidence that prostatic cancer retains a dependence upon the same endocrine factors as does the normal prostate. Concerning both of these aspects, information is fragmentary. The pituitary-adrenal-gonadal relationsnips which are of proved or possible importance in prostatic growth and/or function are set out in a diagram which is referred to in discussing the rationale of the various endocrine measures employed in the therapy of prostatic cancer. These endocrine measures include: castration, estrogen therapy, combined castration and estrogen therapy, adrenalectomy, adrenal corticoid therapy, and hypophysectomy. (Whitmore, W. F., Hormone Therapy in Prostatic Cancer: Am. J. Med., XXI: 697-704, November 1956)

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Cholografin Methylglucamine

Cholografin methylglucamine (methylglucamine iodipamide) is a new improved contrast medium for rapid visualization of the biliary tract following intravenous injection. Superseding Cholografin (sodium iodipamide) it is similar to it in structure with the methylglucamine radical replacing the sodium. The methylglucamine salt of iodipamide is far more soluble than the sodium salt (Cholografin) or the lithium salt.

Cholografin methylglucamine has the same indications and contraindications as does Cholografin. It is, however, a superior contrast medium for rapid visualization of the biliary tract because of the (1) markedly lower incidence of side reactions; (2) greater ease of administration through smaller total volume of the required dose; and (3) at times, improved visualization of the biliary tract. However, it may be wise to delay full evaluation of the latter observation until a fuller understanding of the mechanisms of liver function and its relation to the excretion of Cholografin and Cholografin methylglucamine is gained. At any rate, under identical conditions, the biliary tract is visualized at least as well with Cholografin methylglucamine as it is with Cholografin, if not better.

The patient is prepared as previously recommended when Cholografin is to be used, by dehydration by witholding fluids for at least 12 hours prior to the examination and the administration of a dose of castor oil at bedtime the night before. Strict adherence to these recommendations greatly improves the results of the examination.

This report is based on the examination of 100 nonselected patients referred to the Department of Radiology of the New York Polyclinic Medical School and Hospital for routine examination of the biliary tract. Fifty patients were known to have no previous surgical operations on the biliary tract, and the other fifty patients had undergone cholecystectomy 10 days to 22 years previously. There were 63 female and 37 male patients. The youngest, a female, was 26 years old and the oldest, a male, was 83 years old.

The use of Cholografin methylglucamine is indicated in the following instances:

In patients who have had prior cholecystectomy.

When the gallbladder fails to visualize following oral administration of an opacifying medium.

When, due to disturbed function or disease of the gastrointestinal tract, the patients are unable to retain or absorb orally administered medication.

For prompt evaluation of the biliary tract in the differential diagnosis of acute abdominal conditions.

The contraindications—the same as for Cholografin—are obstructive jaundice and severe liver and kidney disease.

The introduction of Cholografin methylglucamine represents definite progress in the roentgen visualization of the biliary tract. (Shehadi, W. H., Sabbag, I., Cholografin Methylglucamine - New Contrast Medium for Intravenous Cholangiography and Cholecystography: Am. J. Digest. Dis., New Series - 1:466-474, November 1956)

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From the Note Book

1. The Surgeon General of the Navy, Rear Admiral B. W. Hogan, with Senior Medical and Dental Officers of Naval Activities, will conduct a Symposium at the National Naval Medical Center, Bethesda, Md., during the period January 23, 24, and 25, 1957. (TIO, BuMed)

2. Personnel of the Navy Hospital Corps, totalling 197 Chief, First Class, and Second Class Petty Officers, have successfully passed the written examination of the Bureau of Naval Personnel for consideration for officers' grades by a selection board meeting in February 1957. (TIO, BuMed)

3. Governor Leroy Collins of Florida recently appointed Dr. John Bair, research psychologist at the Naval School of Aviation Medicine, as a member

of an Advisory Committee on problems of child care institutions for the State of Florida. (SchAvMed., NAS, Pensacola)

4. A joint article by A. R. Shands, Jr., M. D., and Captain W. D. Bundens, Jr., MC USN, entitled Congenital Deformities of the Spine - An Analysis of the Roentgenograms of 700 Children, written while Captain Bundens was assigned to Alfred I. du Pont Institute, Nemours Foundation, Wilmington, Del., was published in the Fiftieth Anniversary issue of the Bulletin of the Hospital for Joint Diseases, October 1956. (USNH, Philadelphia)

5. An interesting and instructive program was presented by the Orthopedic Service of the Naval Hospital, Philadelphia, Pa., at the November meeting of the Philadelphia Orthopedic Club. This Naval Hospital has functioned as an amputation center for the east coast since 1942. A statistical analysis of the amputations for the last six years of that period was presented by Captain W. D. Bundens MC USN, Chief of the Orthopedic Service. A total of 584 amputations had been admitted during that period of which 385 were major. Several of the civilian limb-makers were present from Philadelphia, along with about 45 patients.

Some of the problems that are special to the amputee were outlined by LT T. Y. Rodgers III, MC USNR. The steps in the construction of both upper and lower prosthesis were outlined by the prosthetists, Mr. Edward Allen and Mr. Max Narod. A total of 20 patients were then presented demonstrating the various types of major amputation problems in their rehabilitation and limb fitting. (USNH, Philadelphia)

6. Very rapid cooling of blood during collection damages red cells, definitely reducing their post-transfusion survival. This damage is probably due to a lesion of the cell membrane. Moderately rapid cooling (to a temperature of 5 to 1° C. in a period of one half to one hour) is compatible with good post-transfusion survival. This rate of cooling appears to give results somewhat more satisfactory than those obtained with slower rates prevalent in the practice of blood banks. (J. Lab. & Clin. Med., November 1956; M. M. Strumia, M. D., et al)

7. The authors report their experience with a patient who became comatose more than 17 months ago. Maintenance of nutrition has been accomplished with homogenized whole food and physiotherapy has prevented all of the complications inherent in the prolonged bed rest. (Am. J. Clin. Nutrition., November - December 1956; R. L. Hopp, M. D., W. J. A. Ford, M. D., S. J. O'Connor, M. D.)

8. Six and one-half years experience with a low fat diet in the treatment of multiple sclerosis is summarized. The diet appears to reduce the frequency of

exacerbations of the disease. The over all severity of the disease appears to be lessened and the performance of 64% of 153 patients has been improved or held stable for nearly 4 years. Early cases appear to benefit most. Only 8% of 59 cases deteriorated during a period averaging 43.3 months. About 65% of 58 late cases and 33% of 36 intermediate cases deteriorated in this same period. (Ann. Int. Med., November 1956; R. L. Swank, M. D.)

9. Two modified charcoal mediums (one diphasic, the other liquid) are described for the growth and maintenance of E. histolytica of the large and small races. The basic medium (from which these were adapted) was described and used by Hirsch for culturing Mycobacterium tuberculosis. (Am. J. Clin. Path., October 1956; R. M. McQuay, Jr., Ph D.)

10. Following experiments on the isolated cat heart, controlled cardiac arrest, using a solution of magnesium sulfate and potassium citrate, was induced in a group of normothermic and hypothermic dogs undergoing right ventriculotomy. It was found that this technique is feasible in allowing recovery after prolonged periods of complete cessation of the coronary circulation and in preventing serious arrhythmias during cardiotomy. The application of this method to cardiac surgery is discussed. (J. Thoracic Surg., November, 1956; W. G. Young, Jr., M. D., at al.)

11. The author describes his operation for obtaining firm, strong fusion of the spinal column by means of arthodesis of the interarticular vertebral facets and the use of double massive tibial bone grafts and numerous chips and shavings of cortical and cancellous bone. He presents histories of patients, drawings, and photographs to illustrate factors of causation, the value of roentgenograms, his classification of spondylolisthesis and the degrees of displacement of the involved vertebrae. (J. Internat. Coll. Surg., November 1956; H. W. Meyerding, M. D.)

12. A review of 11 cases in which transplantation of the spinal cord was done for paraplegia due to a variety of etiologic factors, appears in Arch. Surg., November 1956; J. G. Love, M. D.

13. This article reviews the use of the more important antibiotic agents used in treating bacterial infections commonly seen in the medical wards of a general hospital. (Postgrad. Med., November 1956; S. Cohen, M. D.)

14. The results of treatment of carcinoma of the pancreas and of the papilla of Vater and periampullary area are better than commonly realized, but are still open to marked improvement. This improvement will depend upon early suspicion of the diagnosis followed quickly by adequate treatment. (Am. J. Med., November 1956; E. E. Clifton, M. D.)

BUMED NOTICE 4630 28 November 1956

From: Chief, Bureau of Medicine and Surgery
To: Naval Hospitals
All Activities Having Station Hospitals or Dispensaries

Subj: Aeromedical evacuation, Continental United States

This notice provides information on the current status of air evacuation of patients in the Continental U.S. via Military Air Transport Service.

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BUMED INSTRUCTION 1510.4B 29 November 1956

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical Personnel Regularly Assigned

Subj: Training available to enlisted members of the Hospital Corps Group X

Ref: (a) Catalog of Hospital Corps Schools and Courses (NavMed P-367) (To be issued as an Instruction in 1510 series)

Encl: (1) List of courses, prerequisites, and convening dates
(2) Sample application for Medical Technical Training Schools and Courses

This instruction promulgates information on training available to Hospital Corps personnel and supplements and modifies reference (a). BuMed Instruction 1510.4A is canceled.

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BUMED NOTICE 6120 3 December 1956

From: Chief, Bureau of Medicine and Surgery
To: All Naval Hospitals, CLUSA

Subj: Periodic physical examinations; forwarding reports of

This notice promulgates the necessity for prompt completion and submission of reports of periodic physical examinations of members on the Temporary Disability Retired List.

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DENTAL SECTION

Surgeon General's Symposium - Dental Panel Discussions

A Symposium of the Surgeon General of the Navy with Medical and Dental officers of the Navy will be held at the National Naval Medical Center, Bethesda, Md., January 23 - 25, 1957.

The purpose of the symposium will be to acquaint the Bureau of Medicine and Surgery with problems of the field and to pass on information concerning Bureau policy. The major portion of the symposium will be devoted to informal panel discussions. Attending the dental panels will be Fleet, Force, and Staff Dental officers; the Inspectors of Naval Dental Activities, Pacific and Atlantic Coasts; District Dental Officers; the Commanding Officers of Naval Dental Clinics; and the Commanding Officer, U.S. Naval Dental School, NNMC, Bethesda, Md.

Commencing with the afternoon session on January 23, 1957, and continuing throughout the day on January 24 and finishing with the morning session on January 25, discussions will be conducted on dental matters. Panel subjects will be:

Wednesday, January 23, 1300-1630: Dental Panel on Professional Training Problems

Thursday, January 24, 0830-1230: Dental Panel on Personnel Problems

1300-1500: Dental Panel on Reserve Problems

1500-1630: Dental Panel on Marine Corps and Research Problems

Friday, January 25, 0830-1100: Dental Panel on Planning, Facilities, and Finance

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Who Benefits from In-Service and Out-Service Training

Does time spent in preparing for advancement in rank or rate pay? Ask the personnel of the U.S. Naval Dental Clinic, Naval Gun Factory, Washington, D. C. From the intensive in-service and out-service training program, as implemented at their activity in carrying out the Bureau of Naval Personnel and Bureau of Medicine and Surgery Instructions, they have profited greatly in increasing their education, morale, and worth to the Navy. Their maxim is "Prepare thyself in order to cope with the greatest proposition when opportunity comes."

During the calendar year of 1956, the following results on education have been achieved:

Officer Personnel

One Captain of the Dental Corps U.S. Navy, was successful in passing the examination for certification by the American Board of Prosthodontics.

One Chief Dental Technician and one Dental Technician First Class passed the Medical Service Corps examination and were selected for appointment as Ensigns.

One Chief Dental Technician was selected for Dental Service Warrant Officer and should receive his appointment soon.

One Wave Dental Technician Third Class was chosen for the Nurse Corps Training Program and is attending Boston University.

Enlisted Personnel

The following advancements in rate were achieved by the enlisted personnel who participated in the February 1956 examinations: One DT1 to DTC; Two DT3 to DT2; Eight DN to DT3. Total advancements - Eleven.

As a result of the August 1956 examination, the gain for promotion was: Sixteen DN to DT3. Total advancements - Sixteen.

This presents a grand total of twenty-seven Dental Technicians who received their reward for meritorious achievement. The facts presented prove that a well planned, supervised, continuing education program pays in many ways for all concerned. Mainly, it establishes a cadre of trained Navy personnel to depend on in the event of mobilization. This type of program can be carried on at a small dental activity; However, the cooperation of all personnel is a must.

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Captain Grunewald and Commander Rovelstad Appointed Examining Members of American Specialty Board

Captain A. H. Grunewald DC USN, Director, Dental Department, Naval Administrative Command, Naval Training Center, Great Lakes, Ill., has recently been appointed a member of the Examining Board of the American Board of Prosthodontics.

Commander G. H. Rovelstad, DC USN, Dental Department, Administrative Command, Naval Training Center, Bainbridge, Md., was recently appointed a member of the Examining Board of the American Board of Pedodontics.

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MDU #2 Receives Letters of Appreciation

The Navy's Mobile Dental Units have been performing outstanding work in providing for the dental needs of personnel at naval activities without permanent dental facilities. Spot announcements have been given by local television and radio concerning dental care rendered to personnel of these activities which has greatly enhanced the Navy's role in public relations.

Recently, two letters were received by the District Dental Officer, Ninth Naval District, from Commanding Officers, U.S. Naval and Marine Corps Reserve Training Center, Waterloo, Iowa; and U.S. Naval Reserve Training Center, Cedar Rapids, Iowa, expressing appreciation for dental services rendered by the U.S. Navy Mobile Dental Unit #2 to all personnel attached to these activities.

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MEDICAL RESERVE SECTION

Commendations for Reserve Medical Companies

Four Naval Reserve Medical companies were selected as Outstanding by their respective Naval District Commandants for fiscal year 1956. The Chief of Naval Personnel, Vice Admiral J. L. Holloway, Jr., USN, commended each Commanding Officer by a letter and the Surgeon General, in

forwarding these commendations, added his personal appreciation for the noteworthy achievements accomplished by these nonpay Reserve units. The Outstanding Naval Reserve Medical Companies are:

First Naval District

NavRes Medical Co 1-1
Captain Richard C. Eley MC USNR
300 Longwood Avenue
Boston, Mass.

Sixth Naval District

NavRes Medical Co 6-7
RADM Morton J. Tendler MC USNR
899 Madison Avenue
Memphis, Tenn.

Third Naval District

NavRes Medical Co 3-4
*Captain A. J. Horton MC USNR
202 - 15 Murdock Avenue
St. Albans, L.I., N.Y.

Ninth Naval District

NavRes Medical Co 9-4
Captain Richard B. Schutz MC USNR
3913 West 57th Terrace
Mission, Kan.

*Captain Raymond L. Sippel MC USNR, 182-41, Midland Parkway, Jamaica 32, N.Y., was Commanding Officer of Naval Reserve Medical Company 3-4 at the time that this unit was selected as Outstanding.

Naval Reserve Medical Company 9-4 has received this outstanding evaluation for the third consecutive year. A very special congratulation to their Commanding Officer and members is in order.

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Quotas for Inactive Reserve Staff Corps Selection Boards

A rotational selection board membership policy has been authorized by the Chief of Naval Personnel (BuPers Inst. 1421.1) and implementing instructions for membership of the various staff corps boards are being promulgated by the respective bureaus concerned. By individual letter to Commandants, all Continental Naval Districts, the Chief, Bureau of Medicine and Surgery established quotas for the following inactive selection boards convened under the Reserve Officer Personnel Act of 1954.

CDR - CAPT convenes 19 February 1957 (MC, MSC, and NC)
LCDR - CDR convenes 19 February 1957 (MC and MSC, male and female)
LT - LCDR convenes 30 April 1957 (MC, MSC, and NC)
LTJG - LT convenes 4 June 1957 (MC, MSC, and NC)

For membership on inactive Naval Reserve selection boards the following requirements must be met:

1. The Reservist must be a member of the Ready Reserve.
2. An officer who served as a member of a promotion selection board, active or inactive, the previous fiscal year is not eligible to serve as a member on a promotion selection board, either active or inactive, during the current fiscal year for promotion to the same grade as the previous fiscal year board on which he served. If desired, such an inactive officer may be nominated for membership duty on Reserve promotion selection boards to other grades.
3. A member should normally be in a physical risk classification "A," although physical risk classification "B-1" is acceptable. A physical risk classification "C" officer is considered ineligible; a physical risk classification "B-2" officer may be accepted by the Chief of Naval Personnel under special circumstances with each such case depending on its own merit and the board makeup conditions existing at the time.
4. An officer who has not had a quadrennial physical within 4 years of date of submission of nomination is considered ineligible.
5. An officer passed over once or more for promotion to the next higher grade, except to the grade of rear admiral, by a fiscal year 1956 or subsequent selection board, is not considered eligible to serve as a member of a promotion selection board. Officers have failed selection at least once if their seniority placed them in a duly announced promotion zone and their names did not subsequently appear on a published list of selectees.

Qualified inactive Naval Reserve officers desiring to serve on any of the above and future selection boards to be convened in the Bureau of Naval Personnel should submit an appropriate request to their district commandant.

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Reserve Retirement and Promotion Points Discussed

Retirement points are earned as follows:

1. One point for each day of active duty or active duty for training, including traveling time.
2. One point for each duly authorized drill attended in either pay or nonpay status.
3. One point for each period of equivalent instruction or appropriate duty (with or without pay as authorized by proper authority).

4. Point credit for completed appropriate correspondence courses. Number of points earned vary in accordance with the course completed.

5. Fifteen points are credited for each year of membership in active status, other than active Federal Service. For each Reservist's anniversary year beginning after 15 April 1955, the number of days of active Federal Service (active duty and/or active duty for training) must be deducted to determine the number of membership points creditable in that year.

Promotion points are earned as follows:

1. By completing appropriate correspondence courses or Naval Reserve Officer School courses.

2. Twelve promotion points a year may be earned by one or a combination of the following methods:

a. Active duty (at least fourteen days)
b. Active duty for training (at least fourteen days)
c. Participation in a drilling unit (participation in at least 75% of the number of drills prescribed and in no case less than twelve)
d. Performance of appropriate duty with or without pay authorized by appropriate duty (at least fourteen periods of appropriate duty)

Subsequent to 1 July 1955, promotion points are no longer given for completing a "Year of Satisfactory Federal Service." Also, promotion points are no longer given for extended active duty. Attention is invited to the fact that both retirement and promotion points may be earned by completion of correspondence courses and attendance at Naval Reserve Officer Schools. Retirement points are important to the Naval Reservist for the reason that retirement pay is determined by the number of accrued points divided by 360 and multiplied by 2 and 1/2 times the base pay of the rank in which the individual retires. Retirement time is established by the number of "Years of Satisfactory Federal Service."

Promotion points are important to the Naval Reserve Officer for the reasons that, in order to be eligible for consideration by a selection board, it is necessary that at least 1/2 of the required number of promotion points be earned by the beginning of the fiscal year in which the individual's promotion zone is reached. To qualify for acceptance of a promotion, 24 promotion points per year in grade must have been earned. No more than 144 promotion points are required in order to qualify for acceptance of a promotion. It is the responsibility of each inactive Reserve Medical Department officer to ascertain the number of points required for his selection and ultimate promotion. Promotion point requirements for Naval Reserve officers who are in a promotion zone for fiscal year 1957 appeared in the Medical News Letter, Vol., 28, No. 10, page 33, dated 23 November 1956.

SUBMARINE MEDICINE SECTION

Arctic Operations

Based on cold weather operations of HMCS Labrador during 1954 and 1955, LCDR D. J. Kidd reports in the following manner:

Personnel

No break in watchkeeping can be expected during Arctic cruises because the vagaries of weather, poorly charted waters, unknown tides and ice give a confused picture which means constant anxiety with a never-ending demand for quick decisions and the exercise of fine judgment. Although it is not necessary to have a crew of only hand picked men, it is important there be no obvious "weak links." Professional and social stability are regarded as important as mental and physical fitness.

Climate

Air temperature rarely went below zero degrees F. in open water at sea, but was recorded as low as minus 5° F. ashore or while beset in ice. The average air temperature on deck was 36° F. and the average water temperature was 31° F. In 1955, there were only 16 "sunny" days in 173 days at sea (June - November). Winds up to 75 knots were encountered.

Diving

An underwater television was available. Three hundred and thirty diving hours in water of 28 to 38° F. were recorded during the 1955 cruise. The team had available both standard dress and UDT suits and both oxygen and air equipment. The Pirelli dress was preferred. It was worn over double thickness cellular cotton underwear. "Compressed air was used exclusively for the reason that it was easier to maintain and the dangers of oxygen toxicity in this largely unknown field of extremely cold water diving were avoided. A man can operate in such waters for up to one hour at a time before manual dexterity and shivering render him ineffective."

Medical

Of the several cases of snow blindness encountered, all occurred in men not wearing their sunglasses. Sunglasses are essential for all personnel in the open. Reduction of the light reaching the eyes around the sunglasses is important and requires appropriately designed sunglasses. Sunglasses adequate to protect imposed a handicap on those who needed to see instruments.

The tendency to "eat one's self out of boredom into obesity" was noted.

Shipboard habitability observations indicate a " comfort zone" for Canadian seamen appreciably lower than that recommended by the Association of American Heating and Ventilation Engineers. Canadians preferred conditions between 65 and 67° F., 45 to 55% relative humidity and an air flow of 22 to 25 cubic feet per minute per man.

Because evacuation of patients is often impossible, each unit should be as medically self sufficient as possible. Trauma of one kind or another accounted for a large part of the cases, although the total sick call attendance over a 6-months period was only 5% of complement. There were no cases of frost bite or immersion foot.

Special consideration was given to protective clothing which could be adjusted to meet varying conditions. Although it protected adequately, it often was so bulky as to interfere with action.

(LCDR D. J. Kidd, Medical Aspect of Maritime Arctic Operations: Canadian Services Medical Journal, XII: 751, October 1956)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 16 May 1955.

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AVIATION MEDICINE SECTION

National Advisory Committee for Aeronautics 1956 Triennial Inspection of the Langley Aeronautical Laboratory

The Editor of the Aviation Medicine Section attended the National Advisory Committee for Aeronautics (NACA) 1956 Triennial Inspection of the Langley Aeronautical Laboratory as the official Bureau of Medicine and Surgery representative on 15 - 18 October 1956. The following subjects were discussed at the Inspection and are considered to be of interest to all flight surgeons.

The national security demands that the military services, the aircraft industry, and the NACA, working as partners, accomplish rapid improvement of the performance capabilities of our airplanes and missiles. The magnitude of the over all effort toward this goal is very great and yet it must be remembered that progress can be no faster than the acquisition of new knowledge about aerodynamics, structures, and propulsion. New research techniques and new research tools are needed in the aeronautical pioneering that must be done, but only recently have ways become clear as to how to attack the problems demanding solution. It was the purpose of this Inspection to summarize progress being made to provide answers to some of the major problems in aeronautics.

Future Flight Goals Pose Many Problems

How fast the world of aeronautics is moving is emphasized by comparing the subject matter discussed at the last Triennial Inspection of the Langley Aeronautical Laboratory with that presented this year. In 1953, it was reported that enough had been learned about the aerodynamics of the transonic range to warrant attempts to design tactical airplanes capable of low supersonic speeds. Three years ago, it was noted, "The Task of America's aircraft industry to create designs which will meet the operational and performance requirements of the military services is indeed gigantic."

One reason for the confidence voiced in 1953 was the knowledge, which could not be disclosed publicly for obvious reasons of security, that Richard T. Whitcomb's development of the area rule would be of great value to designers of tactical supersonic airplanes. Only the barest of hints could be given then: "Success or failure of a new design may be dependent upon design differences which can be deceptively subtle."

In 1953, also, a beginning—but only a beginning—had been made on study of the awesome problems posed by man's determination to project missiles at speeds of 15,000 mph or faster along a ballistic trajectory over intercontinental distances. It was known that enormously high temperatures would be generated by air friction at the speeds contemplated, but there was little understanding about precisely what would happen.

Today, the major research effort by the NACA is focused upon acquiring information necessary for achievement at the earliest possible moment of two goals: (1) airplanes speedy enough to shrink the globe until any two points will be within a comfortable day's journey, and (2) ballistic missiles that can travel the required distances at the desired velocities without being destroyed by aerodynamic heating. In 1956, the urgency of these needs is so compelling that the NACA is dealing vigorously, in ways that will produce information directly useful to designers, with the temperature problem.

In a day when the Navy is readying a 1000-mph airplane for carrier service, and the Air Force is buying fighters to operate in the M = 2 range, we are faced already with a temperature rise due to aerodynamic heating at sustained maximum speed of as much as 300° F. Keeping the pilot, the complex electronic gear, the weapons system, and the fuel cool under such conditions is difficult enough; fully as serious is the parallel problem of maintaining the structural integrity of the airplane. An indication of how the problems grow in size may be seen from the fact that the temperature due to aerodynamic heating rises as the square of the velocity.

At the altitudes and speeds of tomorrow's ballistic missiles, air temperatures measured in thousands of degrees will be generated. The fundamental processes that occur in air under such conditions—dissociation of air molecules into atoms and the recombination of atoms into molecules, ionization of the atoms and recombination of the electrons and ions, and the formation of new chemical compounds such as nitric oxide from the constituents of the air—must become clearly understood because they affect vitally the rate and manner in which heat is transferred to the aircraft from the disturbed atmosphere through which it is traveling.

The task of designing equipment that will be useful in conducting the necessary fundamental research has been formidable. The great difficulty has been in learning how to duplicate in the laboratory the extremely high temperatures and other conditions of future flight. Only recently, have ways been learned how to design and build the small pilot models with which to demonstrate the practicability of constructing the radical new tools so necessary for the rapid expansion of the limits of our knowledge.

At the same time, the use of rocket-powered research models and of full-scale research airplanes is being extended to higher altitudes and greater speeds. At the 1953 Inspection, work with rocket-powered models capable of reaching M = 4 was discussed; today, models basically similar have been flown faster than M = 10 (6600 mph at altitude). The recent loss of the Bell X-2 inevitably will slow the rate of full-scale flight research on aerodynamic

heating problems, but the specially instrumented X-1-B and the 4-percent-thin-wing X-1-E can, and are, being used profitably in conduct of this program. Still under construction is the North American X-15, designed to have higher speed and altitude capabilities than possessed by present research airplane.

Ways to fly faster and yet survive the effects of aerodynamic heating are required with overriding urgency. The problems faced are new and complex. And yet it is impossible to forget or neglect the old problems of aeronautics which refuse to remain "solved." With each advance in speed, such familiar bug-a-boos as flutter, turbulence, stability and control, and aerodynamic interference rise again with new virulence.

Grave Heat Problems Require Early Solution.

Before design of aircraft and missiles capable of tomorrow's high speeds can be undertaken on a rational basis, a much better understanding must be gained of the mechanics of aerodynamic heating. Already, much has been learned about the processes of aerodynamic heating at the relatively low supersonic speeds envisioned for conventional airplanes, but even here more information about the problem is urgently needed. Our understanding is still imperfect—to say the least—respecting aerodynamic heating in the higher speed ranges above 10 times the speed of sound at which intercontinental ballistic missiles and even man-carrying hypersonic gliders may fly.

In essence, aerodynamic heating is the conversion into heat energy of the kinetic energy of the air through which the airplane or missile is flying. This conversion takes place in the area of the shock wave and in the boundary layer where the air velocity is slowed as it approaches the body. The temperature increases as the square of the velocity. At a Mach number of 3 (about 2000 mph at altitude) the temperature would be about 660° F. At a Mach number of 20 (about 13,000 mph) the temperature would be above 20,000° F., far hotter than the surface temperature of the sun.

The heat energy which is generated by high-speed flight first appears in the boundary layer surrounding the surface of the aircraft. Then it is transferred through the boundary layer into the aircraft structure. Since the heat-transfer rate for a laminar or smooth boundary layer is considerably lower than that for a turbulent boundary layer, maintenance of laminar flow to the maximum extent possible is vital. At the same time that heat energy is being absorbed by the aircraft structure, radiation is dissipating some of it. If stabilized flight is maintained, a balance between heat input and outgo must be achieved. The desired goal, of course, is a temperature balance low enough so that the aircraft structure will not be destroyed.

In conventional aerodynamics, the atmosphere is considered to be composed of stable molecules of the various elements in air, but, at the velocities where aerodynamic heating becomes a serious problem, the

molecules in the air no longer behave in the orderly way postulated in the "ideal gas" laws. It has become essential, therefore, to determine the thermodynamic properties of air at high temperatures.

At relatively low temperatures, molecules move about in three-dimensional space; the higher the temperature, the faster their straight-line movement. At temperatures above 500° F., the molecules begin to vibrate. At temperatures exceeding 5000° F., a part of the heat energy within the molecules is changed into chemical energy; some of the molecules dissociate or split apart into free atoms. New molecular combinations appear, notably nitric oxide.

At even higher temperatures, approaching 20,000° F., ionization or electronic excitation of the atoms and molecules occurs. In the thermodynamic studies already made, some 40 reactions among the molecules and the atoms and their components have been noted. Although only a dozen or so are believed to be of great significance, accounting completely for even these 12 reactions is an enormously complex problem and useful solutions will require the efforts of many talented workers using both theoretical and experimental techniques.

Experiments Prove Helpful.

In developing ways by which aerodynamic heating can be investigated experimentally in the laboratory at speeds which airplanes and short-range missiles may soon be expected to reach—below a Mach number of 5— it has been found desirable to employ two general techniques: (1) equipment incorporating radiant-heat sources which is especially useful in the study of basic structural heating problems; and (2) facilities in which both the actual aerodynamic heating and loading experienced by a structure at a specific velocity can be duplicated.

A more advanced type of heat radiator uses quartz-tube heat lamps that reach operating temperatures very rapidly and cool quickly. With this apparatus, such matters as the difference in thermal expansion of the aircraft skin and its stiffeners can be studied under closely controlled conditions. It can be used also to heat a wing structure unsymmetrically, that is, at the different rates, top and bottom, that would be experienced during a pull-up maneuver at high supersonic speed. At the same time distributed loads can be applied, thus simulating closely the flight condition under study.

For several years, supersonic air jets have been used to provide in the laboratory the true aerodynamic heating and the true aerodynamic loads applied to a structure at a specific flight velocity. The research information so obtained has been of great value, but the need has become apparent for a much larger supersonic jet that will enable extending this work to laboratory investigations of aerodynamic heating and loading on full-scale structural components.

Such a facility is now under construction at the Langley Laboratory. The test section will be 8 - 3/4 by 6 feet and the test range will be M = 2 to 3. To compensate for the temperature drop of the air as it passes through the supersonic nozzle of the blowdown tunnel, the air will be preheated as has been the case with the smaller supersonic jets. In this instance, it will be necessary to use an accumulator holding 600,000 pounds of stainless steel sheet to store the heat. Temperatures up to 660° F. corresponding to M = 3 flight at high altitude will be provided at the test section of the new tunnel which is expected to begin operating early in 1957.

New Techniques Necessary.

Difficult as are the aerodynamic heating problems occurring at speeds up to a Mach number of 5, they seem straightforward and relatively simple when compared to those which must be solved in the hypersonic range beyond. It is not enough to shoot a 12,000 mph intercontinental ballistic missile along a trajectory of heights where aerodynamic heating becomes negligible. It must also be delivered in lethal condition, and during its descent the heating rates may well become so high as to destroy the missile before it can reach its target.

Hardly less difficult than the problem itself is learning how to duplicate in the laboratory the enormously high temperatures that will be generated in flight. Recently, techniques have been devised sufficiently promising to warrant construction of small pilot models to prove their worth.

One approach is to build apparatus in which aerodynamic heating can be generated to match very high Mach number conditions. Such equipment includes shock tubes, special compressors, and light-gas guns. In the shock tube, for example, a shock wave heated to many thousands of degrees Fahrenheit passes over a model, but the desired condition can be maintained for only a tiny fraction of a second.

At the Ames Aeronautical Laboratory, at the Naval Air Station, Moffett Field, California, a special light-gas gun has been constructed, capable of firing a small model at speeds up to M = 20. In one experiment, a magnesium model was fired at a velocity of 11,000 mph, and although the time of flight was extremely short, the heat input was high enough to ignite the metal model. Much can be learned from this technique because, despite the difficulty of obtaining information from the rapidly moving model, the temperature simulation is close to that experienced in flight.

At the lower end of the hypersonic range, combustion-products tunnels are proving useful. They are essentially ram-jet or rocket engines exhausting their hot jets into supersonic nozzles. Despite the fact that the chemical composition of the exhaust gases differs from that of air, these jets are valuable because they can be used to duplicate the temperatures, velocities, and pressures of airstreams at speeds up to M = 8 or higher.

Still another technique, proven only recently in a small pilot model, provides a jet of air heated to 4000° F. and corresponding to that encountered above M = 5. Although these conditions can be maintained for only 20 seconds at a time, the air flow and temperatures possibly match closely conditions experienced in actual flight.

The apparatus differs from other facilities in that temperatures above 4000° F. can be maintained in the heat exchanger used. It would be virtually impossible to build such a heat exchanger even from the most heat-resistant of metals. Instead, the exchanger was lined with a ceramic material similar to, but more effective, than that used in blast furnaces. The material used to store the heat inside the exchanger is also ceramic; in appearance it looks like millions of small marbles. After the exchanger has been brought up to the desired temperature, a supply of air is forced through the mass of heated "marbles," and into a supersonic nozzle that must be cooled internally to keep it from melting. So successful has the pilot model been that a larger version with greater capacity is now being constructed at the Langley Laboratory.

Studies in Flight

In addition to the research attention being given the aerodynamic heating problem in the experimental facilities of the Ames and Langley Laboratories, increased use of flight vehicles is being made to study the high-temperature problems in the actual environment and under the same conditions as will be encountered by tomorrow's high-speed airplanes and missiles.

Specially designed full-scale research airplanes are now being flown at the NACA's High-Speed Flight Station at Edwards, Calif., to investigate aerodynamic heating in the M = 2 to 3 range. Despite recent destruction of the Bell X-2 in the tragic accident which cost the life of an Air Force pilot, this program is being extended by further fruitful use of the X-1-B and X-1-E. The first of these has been fitted with a mass of thermocouples and other temperature-recording instrumentation to permit detailed evaluation of aerodynamic heating on an airplane flying above M = 2. The X-1-E is fitted with a 4-percent-thick-wing and also with additional fuel tankage to permit plus M = 2. flight for a somewhat longer time. Now under construction by North American Aviation is the X-15, designed to fly faster and higher than man has ever ventured. The new airplane is being procured by the Air Force as a part of the continuing flight research effort in which the military services, the aircraft industry, and the NACA are teamed.

Rocket-propelled models are fired to hypersonic speeds from the NACA's Wallops Island, Va., field station. In order to reach the speeds desired for study of the heat problem, engineers of the Pilotless Aircraft Research Division had first to discover the reason for a disturbing series

of failures in midair. Ironically, the high rate of aerodynamic heating, experienced for only a second or two, was to blame. The cheap cast magnesium fins used to assure stability of the second-stage rocket were being destroyed by the heat. This failure occurred only 9.3 seconds after model launch by which time a speed of about M = 4 had been reached. Covering the leading edge of the fins with thin sheets of inconel gave a "quick fix" that protected the fins for the necessary brief period of additional time.

Because aerodynamic heating becomes most serious in the denser air near the earth, use of an "over-the-top" trajectory is being made. Models fired in this manner are also propelled by four rocket stages. The first two stages are shot off while the model is still climbing, while firing of the two remaining rockets is delayed until after the model has begun to descend. In this manner, large-scale information is being obtained about heating rates during the re-entry period of a missile's journey.

Interference at Supersonic Speeds

Design engineers always have had to give careful consideration to the aerodynamic interference which occurred when flow around one part of the airplane disturbed another. For example, the flow fields around the wing, in level or maneuvering flight, could hit the tail in such fashion as to reduce the effectiveness of the rudder or elevators. Usually, in the case of subsonic airplanes, avoidance of undesirable interference effects was a reasonably straightforward and easy task.

With the attainment of supersonic flight, the problems of aerodynamic interference have grown in severity and complexity. As Mach number is increased, pronounced changes can occur in the patterns and strengths of the flow fields with marked changes resulting in the aerodynamic effectiveness of surfaces immersed in these flow fields. A clear understanding of the nature of these flow changes is imperative if an airplane or missile is to fly acceptably throughout the range from take-off to maximum speed.

In addition to interference from the physical components of the airplane, the streams of hot gases from turbojet engines can cause serious interference effects. For example, as operating altitudes increase, the flow pattern of the jet may change. It is possible that a jet exhaust which caused no harmful interference at 20,000 feet could produce at 60,000 feet a flow pattern resulting in serious interference.

For such problems to be studied in the close detail that is essential, the designer must have large amounts of "tunnel time" in which he can investigate the aerodynamic interference characteristics of his proposed airplane or missile through its entire operating range. And once he has made the necessary design changes to eliminate the interference difficulties, he must have more tunnel time in which to determine the adequacy of his remedial action.

Unitary Tunnels Serve Industry

As long ago as 1946, the need was recognized for supersonic wind tunnels capable of providing the large-scale information essential for design of faster-than-sound aircraft. The Unitary Wind Tunnel Plan that was evolved made possible construction of a number of these tunnels and within the past year badly needed large supersonic wind tunnels have been completed and placed in operation at each of the NACA's three major research centers. These tunnels are now being used intensively by airframe and engine manufacturers on development test work.

The Unitary Plan Tunnel at the Langley Laboratory has two 4-by 4-foot test sections. Sliding block nozzles permit changing test speed while the tunnel is operating. In the first, the speed can be varied from $M = 1.5$ to 2.7; in the second, from $M = 2.5$ to 5. Because the tunnel can be operated at pressures up to 10 times atmospheric density, it is possible in the low Mach number test section to simulate the full-scale conditions experienced by a fighter airplane flying beyond $M = 2$ at 70,000 feet, and in the high Mach number test section by a 40-foot missile operating at $M = 5$ at 70,000 feet.

Although only one test section at a time may be used, it is possible by a special valving arrangement to shift at will the air flow from one section to the other without shutting down the tunnel flow. Electric motors with a combined 30-minute-overload rating of 100,000 hp drive the six centrifugal compressors. In addition to measurement of aerodynamic forces on the model, pressure distributions may be obtained and flutter and aerodynamic heating investigations can be made.

One of the major problems faced by designers of supersonic fighters which can be studied in the tunnel is the decrease in directional stability that occurs as speed increases. What happens is that conventional lifting surfaces, such as the vertical tail, tend to lose their lift effectiveness as the Machnumber increases. The positive directional stability of an airplane may be diminished until it becomes unacceptably low and, by moving the tunnel speed upward, the advent and seriousness of this phenomenon, as it affects a particular design, can be studied in detail.

Flight Pilots Look to the Future

With 1000-mph tactical airplanes now going into military service, aeronautical trail blazers have extended their goals. To those who look beyond tomorrow, thoughts of man-carrying aircraft that travel at speeds five times or more the velocity of sound appear within the realm of relatively early attainment.

In considering what difficulties the pilot will face in flight into the high reaches of the atmosphere at speeds of 3000 mph and faster, it becomes apparent that many of his problems will result from the fact that his airplane

must be capable of maneuverable flight from sea-level take-off to altitudes where the density of the air has thinned sufficiently to make possible the desired speed without destructive aerodynamic heating.

His airplane will have very thin wings of low aspect ratio. Because of low-aspect-ratio, wings are incapable of producing the high lift needed during landing and it is likely that variable geometry of the lifting surfaces may be required. During cruise at high altitude, the inertia of the airplane will be high and the response to the controls will be sluggish. Any disturbance of the airplane will result in oscillations that will be very difficult to control.

To permit preliminary studies of the control problems of such very high-speed flight, a simulator has been constructed at the Langley Laboratory. It is capable of duplicating the vertical motion and pitching motion of almost any possible airplane. By a preprograming technique, the pilot can be confronted with the control problems respecting these two motions that he would face in a flight from low speed at low altitude to high speed at high altitude and then return.

Repeated Loads Cause Failures.

Today's airplane is subjected to all manner of recurring loads. If repeated enough times, simply or in combination, these can result in structural fatigue leading to failure. NACA research on this problem has three broad objectives to: (1) reduce the loads imposed on an aircraft, (2) find ways of designing the structure to withstand the loads, and (3) find ways of preventing complete or catastrophic failure should a smaller failure occur. Work also is being done on problems posed by flutter occurring at supersonic speeds.

One promising method of reducing the effect of turbulence is through the use of spanwise, retractable spoilers or deflectors located, respectively, on the top and bottom of the wing. Experimental work at the Langley Laboratory indicates the possibility of reducing both the number of the smaller gust loads by half and the intensity of the larger gustloads by 25 - 30 percent. Further evaluation is now being planned using the gust alleviators in full-scale flight.

With flight of both commercial and military airplanes being carried to higher altitudes, the use of pressurized fuselages has become more general. There have been, however, a number of cases of failures of the pressurized structures, ranging in severity from minor breaks that were noted and repaired before extensive damage occurred to catastrophic ruptures that destroyed aircraft. One cause of these catastrophic failures has been found to be fatigue cracks.

Tests were made using stiffened cylinders under repeated stresses due to changes in internal pressure and subjected to cyclic torsional loading.

Detailed information has been gathered about ways of preventing fatigue cracks from leading to catastrophic failure by use of adequate internal reinforcing structure. In this manner, the danger of explosive failure of pressurized fuselages from such causes may be virtually eliminated.

A relatively new area of NACA loads research has to do with the relatively small loads, repeated several million times during a single flight, which are imposed upon the structure of an airplane by the power plants. Work already done indicates that, in some instances, a reduction in the fatigue-producing severity of such loads can be obtained by repositioning the engines. In other cases, it may be necessary to modify the structural details to enable them to withstand the loads for a longer time. Although valuable trend information has already been obtained, further research will be needed before an optimum structure for a given load condition can be confidently stated.

Another form of recurring load is flutter, a self-induced vibration that can result in quick and complete destruction of the afflicted part. As airplane and missile speeds are increased, the tendency towards flutter increases. Two parts of the flutter problem at high speeds are of special current interest. One of these involves free play in control surface linkages and has been of particular concern on new research airplanes. Experimental and theoretical studies have shown that by limiting the free play of the linkage to a minimum the flutter disappears. In a second instance, it has been found that aerodynamic heating from rapid acceleration to speeds as low as $M = 2$ can cause a wing to flutter. Although the wing does not flutter when the temperature is uniform, even when very hot, flutter is experienced while the structure is being heated. The cause was found to be the large loss of torsional stiffness resulting from uneven temperatures over the wing surface. Once the entire wing reaches a uniform temperature, the flutter stops. The problem is serious and research is continuing to develop structures that eliminate the adverse effects of temperature distribution on flutter.

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Research Reserve Seminars

A series of seminars is sponsored annually by the Chief of Naval Research in behalf of the Naval Reserve Research Program. Two of these seminars this year are concerned with the fields of medicine and the life sciences, one at the U.S. Naval School of Aviation Medicine, Penascola, the other at Brookhaven National Laboratory, Upton, New York. Both serve as

fourteen days AcDuTra, first, for members of the Naval Reserve Research Program; second, for appropriately qualified members of other Naval Reserve programs; and third, for similarly qualified Reserve officers of the other Armed Services. Applications should be forwarded via the usual chain of command. Inquiries may be addressed to the Office of Naval Research, Code 120, Navy Department.

I. Title: Research Reserve Seminar in Aviation Medicine
Sponsorship: Bureau of Medicine and Surgery, ONR, Naval Air Training Command, Naval School of Aviation Medicine
Subject matter: Physio-psychological problems of high-speed, high-altitude flight; latest developments in aviation medicine; related subjects
Location: U.S. Naval School of Aviation Medicine, Pensacola, Fla.
Convening date: 13 May 1957. Clearance: Secret

II. Title: Research Reserve Nuclear Science Seminar
Sponsorship: ONR, Brookhaven National Laboratory, AEC, Naval Reserve Research Company 3-9
Subject matter: Research in the applications of nuclear science to medicine and the life sciences
Location: Brookhaven National Laboratory (AEC), Upton, N. Y.
Convening date: 27 May 1957. Clearance: Secret

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